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APR 5 1912

Thomas A Edison
Electric Light Plants



March 3rd 1880

Dear Mother



Thomas A. Edison Electric Light Plants



For Country Homes

Bulletin 200

Edison Storage Battery Company

Orange, New Jersey

Thomas A. Edison Electric Light Plants



I have been experimenting for many years
to produce a reliable storage battery for use
in connection with the lighting of country
houses and I did not offer it to the public
until I knew it would give satisfaction

Thomas A. Edison

Introduction

The greatest need of the country home is an efficient, reliable and safe lighting system.

Candles and oil lamps are conceded by all to meet none of these requirements. They are inefficient, unreliable, unsafe and altogether unsatisfactory and need considerable attention to get best results.

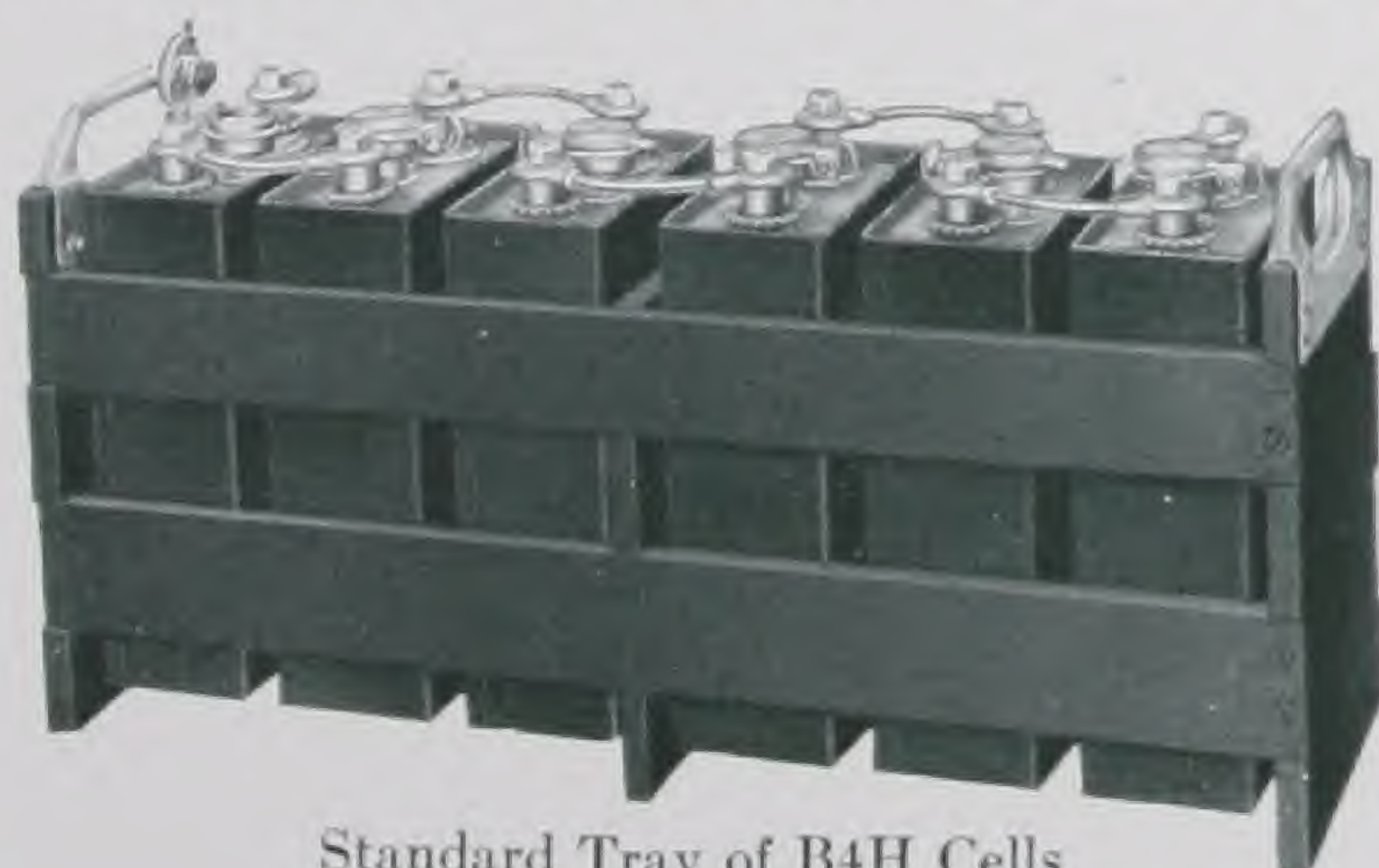
As a result of this condition, several forms of gas lighting systems have been introduced, but with very little improvement over the candle and oil lamp. They give more light, but require a much larger amount of attention, and are more dangerous to life and property, due to danger of fire and explosion. News items of such disasters are so frequent as to furnish ample proof of this.

With the perfection of the Edison Incandescent Electric Lamp, and the invention of the Edison Storage Battery, a system of electric lighting has finally been perfected. All other forms of lighting have given way to electric lights. Only those directly interested in the sale of oil, gas and acetylene lighting plants and fixtures deny that electric lights form the safest, most convenient and most economical system of illumination that has ever been invented. This fact is confirmed by the extensive use of electricity for lighting and power in all cities and towns where it is available through central station service.

Electric lights possess a great many desirable and dependable qualities not found in any other form of illumination. With electric lights, fire risk may be considered as negligible. With any lamp producing an open flame for illumination, and requiring matches for ignition, the danger is ever present.

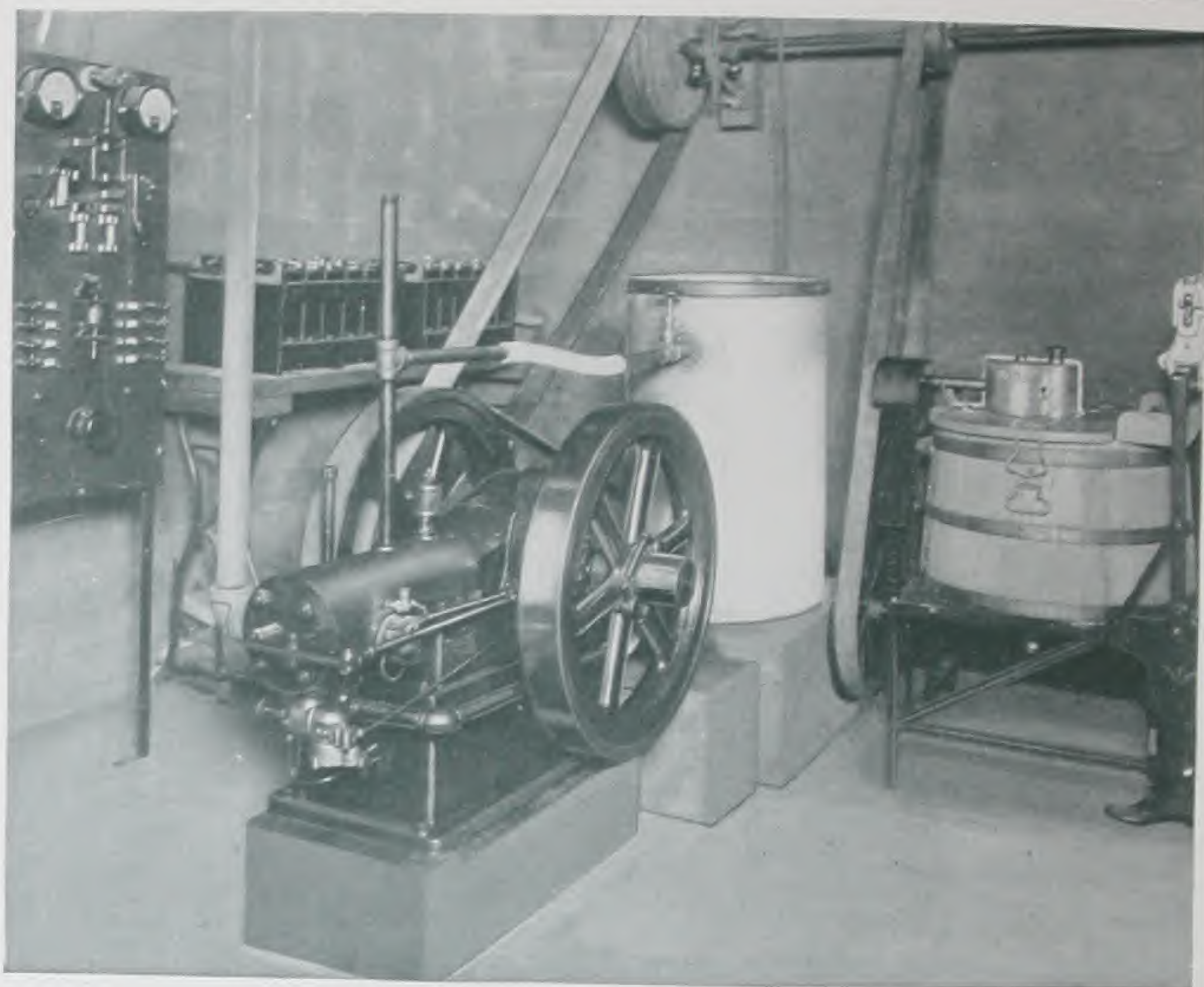
Electric lighting is the most convenient and the safest, as it is only necessary to turn or push a conveniently located switch to flood

the room with clean white light. Electric light is not dirty, causes no smoke and requires very little attention. No extreme heat is generated, since the light is produced in a closed bulb, or lamp; consequently it is easily seen that when the rooms are



Standard Tray of B4H Cells

Thomas A. Edison Electric Light Plants



A Compact Power and Lighting Plant

more or less closed in winter the ventilation will be better; and in summer the electric light is by far the coolest. These, with the other advantages explained throughout this booklet, will convince you that electric lights are universal and desirable for the illumination of houses and other buildings, no matter where they may be located.



The All-Steel
Edison Cell

Having received a number of requests from country home owners for an improved and safe lighting system, and fully realizing the shortcomings of those in use at the time, Thomas A. Edison resolved to perfect an electric-lighting system which would be efficient, clean and safe, which could be installed in each home and operated with the least possible attention and expense. The result was the Thomas A. Edison Electric Light Plant, using the Edison Storage Battery, the success of which has already won world-wide recognition.

Thomas A. Edison Electric Light Plants for Country Home Lighting

The invention of the incandescent electric lamp by Thomas A. Edison, in 1879, has made it the desire of all to have electric lights. Until the introduction of the Thomas A. Edison Electric Light Plant this privilege had been enjoyed to the fullest extent only by those living in cities.

The invention of the Edison Alkaline Storage Battery, and its perfection for the purpose of lighting houses, is one of the great advances in the world's progress vitally affecting the family. The development of the Edison Storage Battery and the Edison Mazda electric lamp offered owners of country homes lighting facilities that put them on even terms with dwellers in cities and districts served by central lighting stations. The light furnished by the Edison Electric Light Plant is more satisfactory in all respects than that furnished by any other form of isolated lighting ever produced.

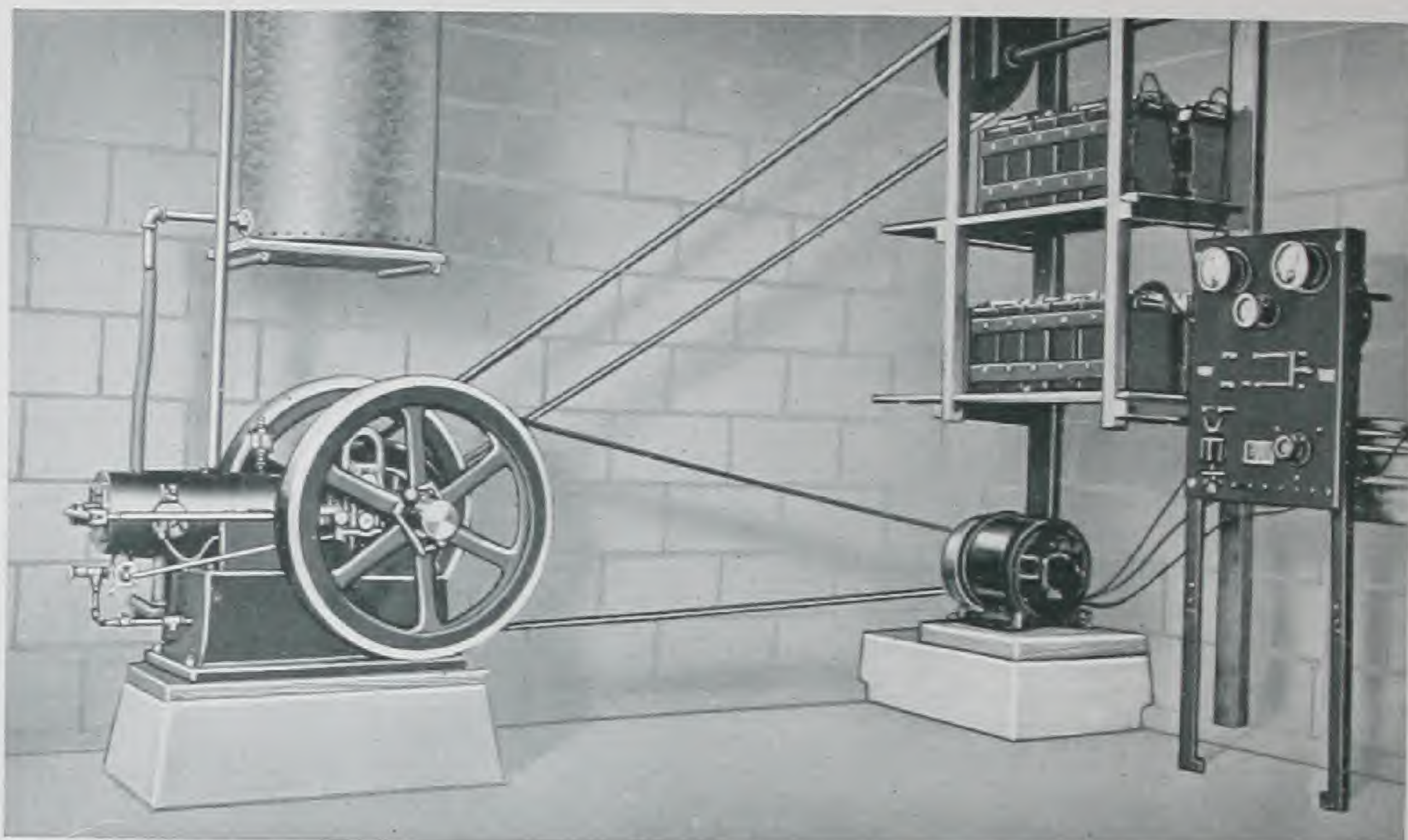
An Edison Electric Light Plant consists of an engine, a dynamo, an Edison Storage Battery and an Edison Standard Switchboard. The principle of operation of the plant is as follows:—the engine drives the dynamo, which generates electricity; wires conduct this electricity to the storage battery and the storage battery becomes charged.



Thomas A. Edison Electric Light Plants

When the battery is charged, the engine and dynamo are stopped, and electricity may be taken directly from the battery, as required. In other words, a storage battery may be considered as similar to a supply water-tank. Water is pumped into the tank, and when the tank is full the pump is stopped, and the water is used at will.

In many instances engines are used to furnish power for pumping water, milking-machines, washing, sawing wood, cutting feed, and



A 30-Volt Edison Plant

many other services. In these cases the storage battery can be charged while the engine is doing other work, reducing to almost nothing the operating cost to be charged to the electric lights.

It would be poor economy to operate an electric light plant without a storage battery. Of course, electricity may be had directly from the dynamo, but this and the engine would have to be operated continually, or started up whenever electric light or power are needed, no matter how little. If only a few lights are required the comparatively large engine and dynamo must be operated whenever the lights are needed, this being very inefficient and costly. If for any reason the engine is stopped for repairs, no electricity is available and candles or oil must again be resorted to for light.

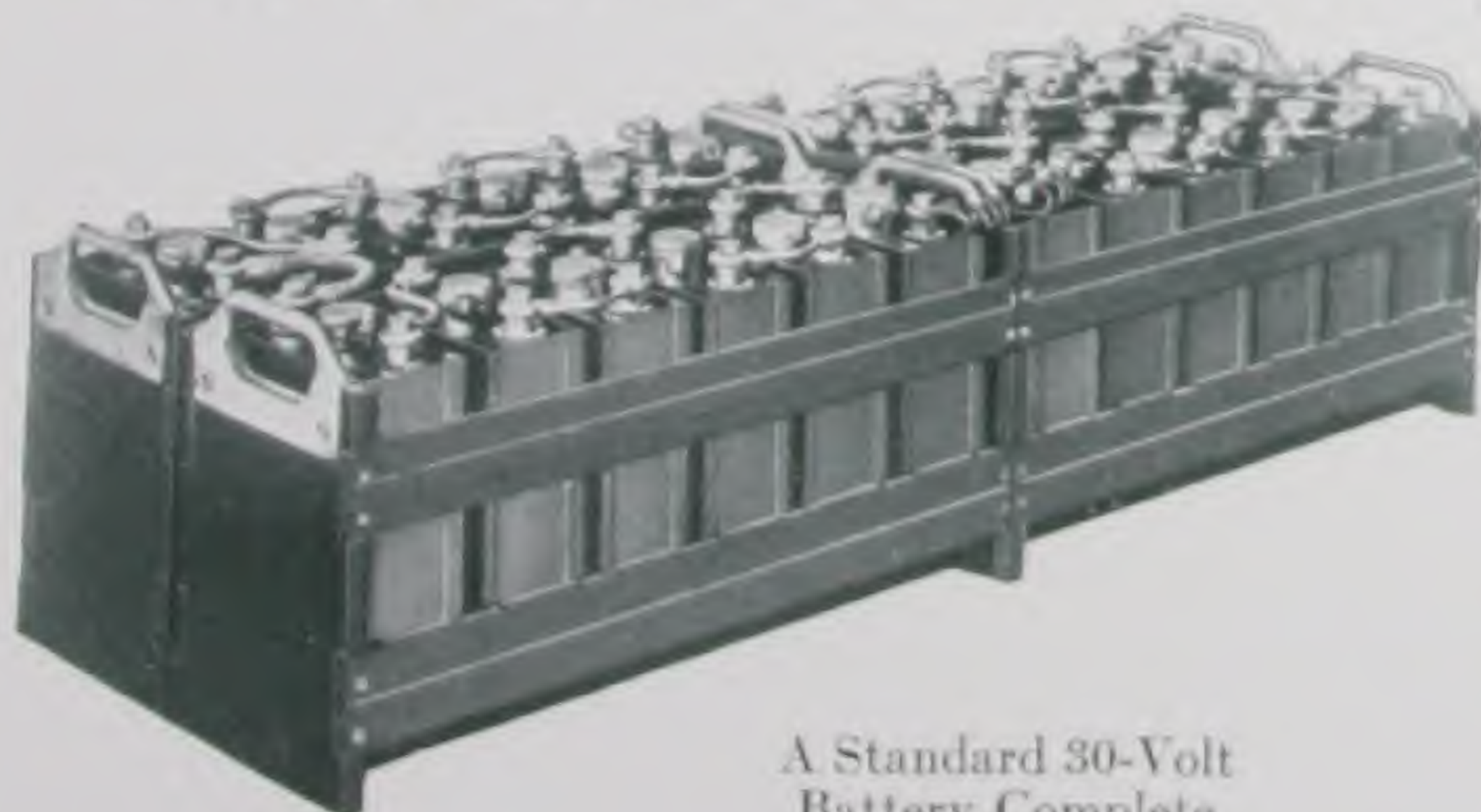
From this it follows that the storage battery system is by far the better one; besides being safe and flexible it insures a steady, dependable 24-hour per day lighting service without annoying inconveniences.

Advantages of the Edison Storage Battery for Electric Lighting

The storage battery is the chief factor of the individual lighting plant, as it furnishes electricity for lights when most needed—that is, at night when the engine and dynamo will not or cannot be run. It is then clear that the storage battery requiring the least attention and giving the best service is the battery most desirable.

The superior features of the Edison Storage Battery over all other types of batteries have caused them to be generally adopted for house-lighting service. When you buy a house-lighting plant you want to know that the operation of the battery will be so simple that you are assured of absolute satisfaction, with a minimum of personal care and attention. It is, therefore, highly important that you consider carefully the storage battery situation, from all angles, before finally making your selection. The Edison Battery offers the following advantages:

- 1—Expert attention is not required.
- 2—No internal cleaning of the cells is necessary.
- 3—It is not necessary to mount cells in sand trays.
- 4—No acid is used, the electrolyte being an alkaline solution.
- 5—Complete discharge does not injure the Edison Battery.
- 6—No end cells are used in the Edison system.
- 7—Instead of glass or rubber jars, the Edison cell containers are nickel-plated steel.
- 8—The plates cannot become short-circuited by “buckling” or “growing”.



A Standard 30-Volt Battery Complete

- 9—Irregular charging periods are of no consequence, thus permitting charging to be done at the convenience of the operator.

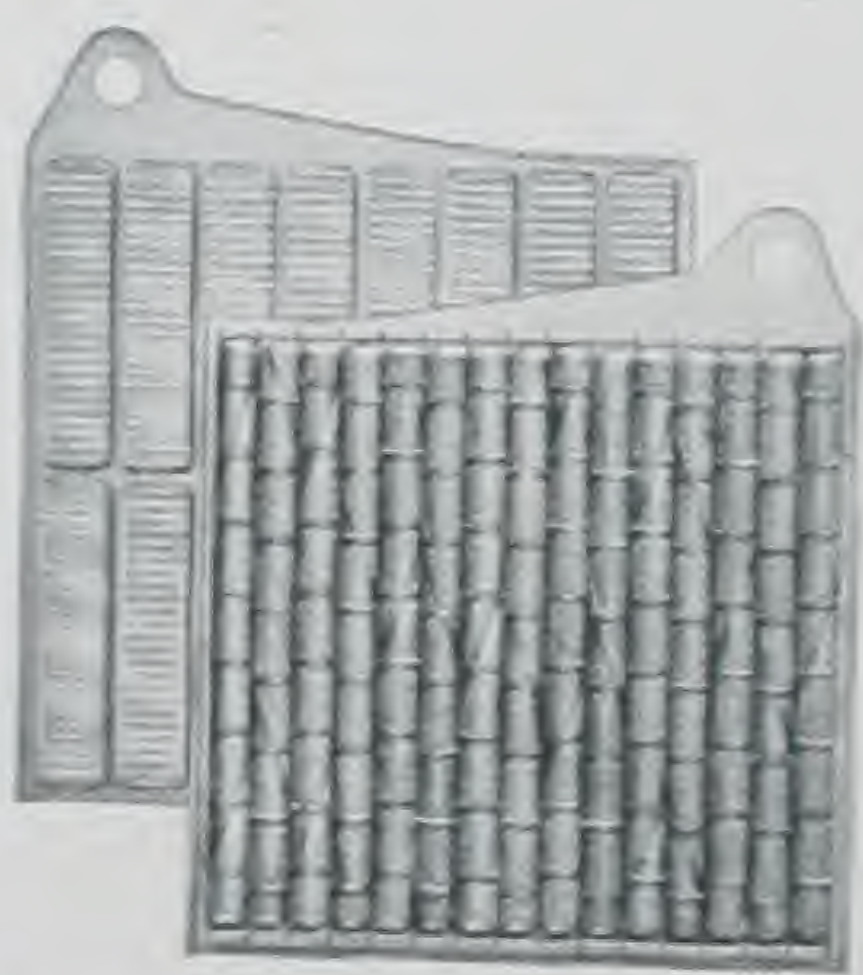


Thomas A. Edison Electric Light Plants



The Edison Plant Shown on Page 9 Has Brought Comfort and Safety to this Home

- 10—Current flow may be accidentally reversed, without injury to the cells.
- 11—No expensive racks for the cells, as the Edison cells are all assembled and mounted in trays when shipped from our factory to you.
- 12—There are no corrosive fumes. The battery can be placed in the same room with your machinery without causing corrosion.
- 13—Chemical disintegration is unknown with the Edison Battery, as the electrolyte is a preservative of the active material and plates.



All-Steel Plates Used in Edison Non-Acid Battery

- 14—It occupies smaller space than other batteries and the weight is also very much less. It is thus very easy to handle the Edison Battery and place it in the most convenient position.
- 15—The continual use of a hydrometer is not necessary. The density of the electrolyte does not change in the Edison Battery during charge and discharge, because it acts merely as a conductor of electricity and does not attack the plates.

16—The normal rate of charge can be given at all times. Other batteries must be charged at a low rate for a consider-

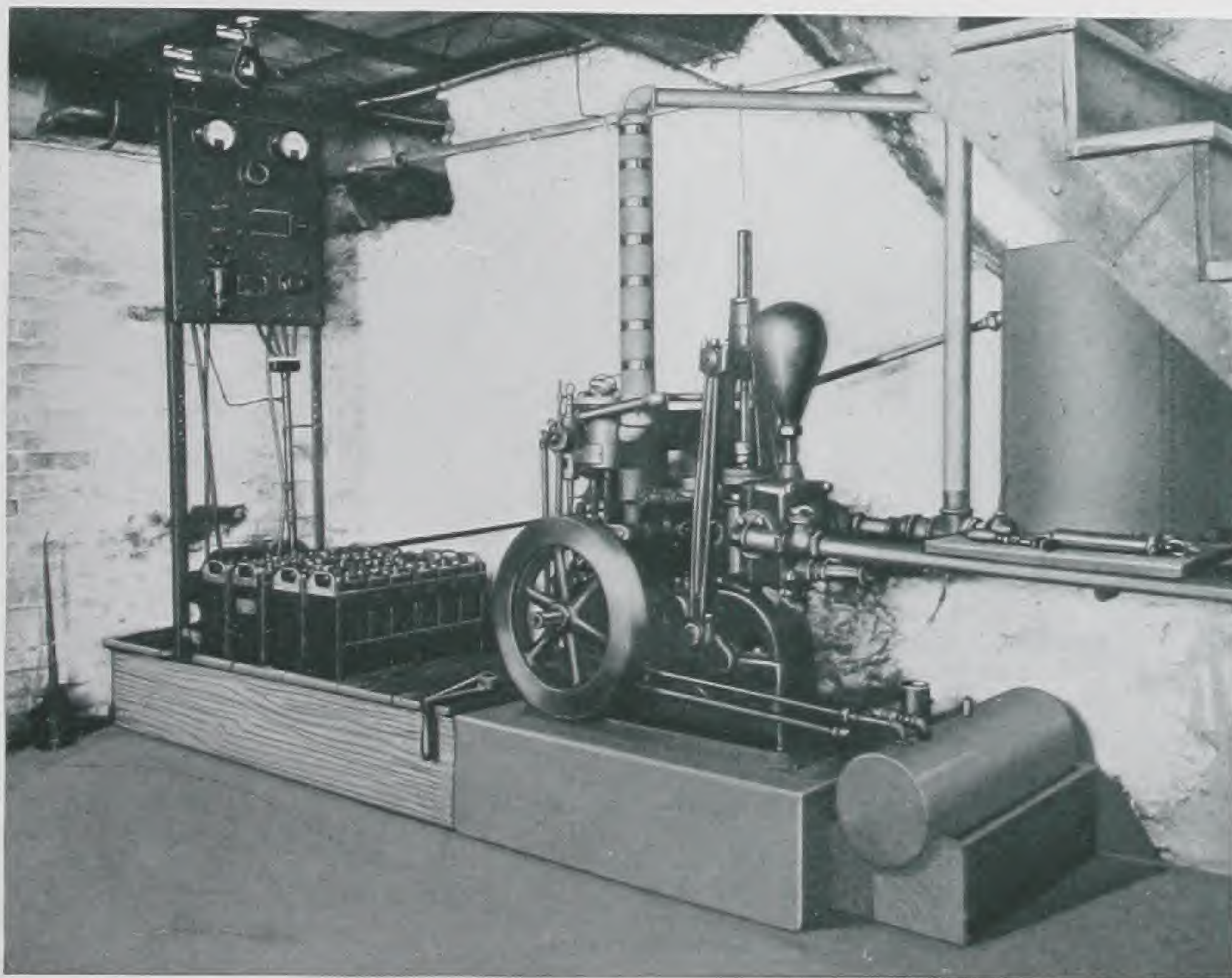


able period after the first normal rate run, and your engine must thus be operated under light load, with consequent loss of efficiency.

17—It is not necessary to completely discharge the Battery before commencing another charge. You can start your engine whenever it is convenient and recharge the battery. Everything about the Edison Electric Lighting System lends itself to your comfort—you do not have to accommodate yourself to any shortcomings.

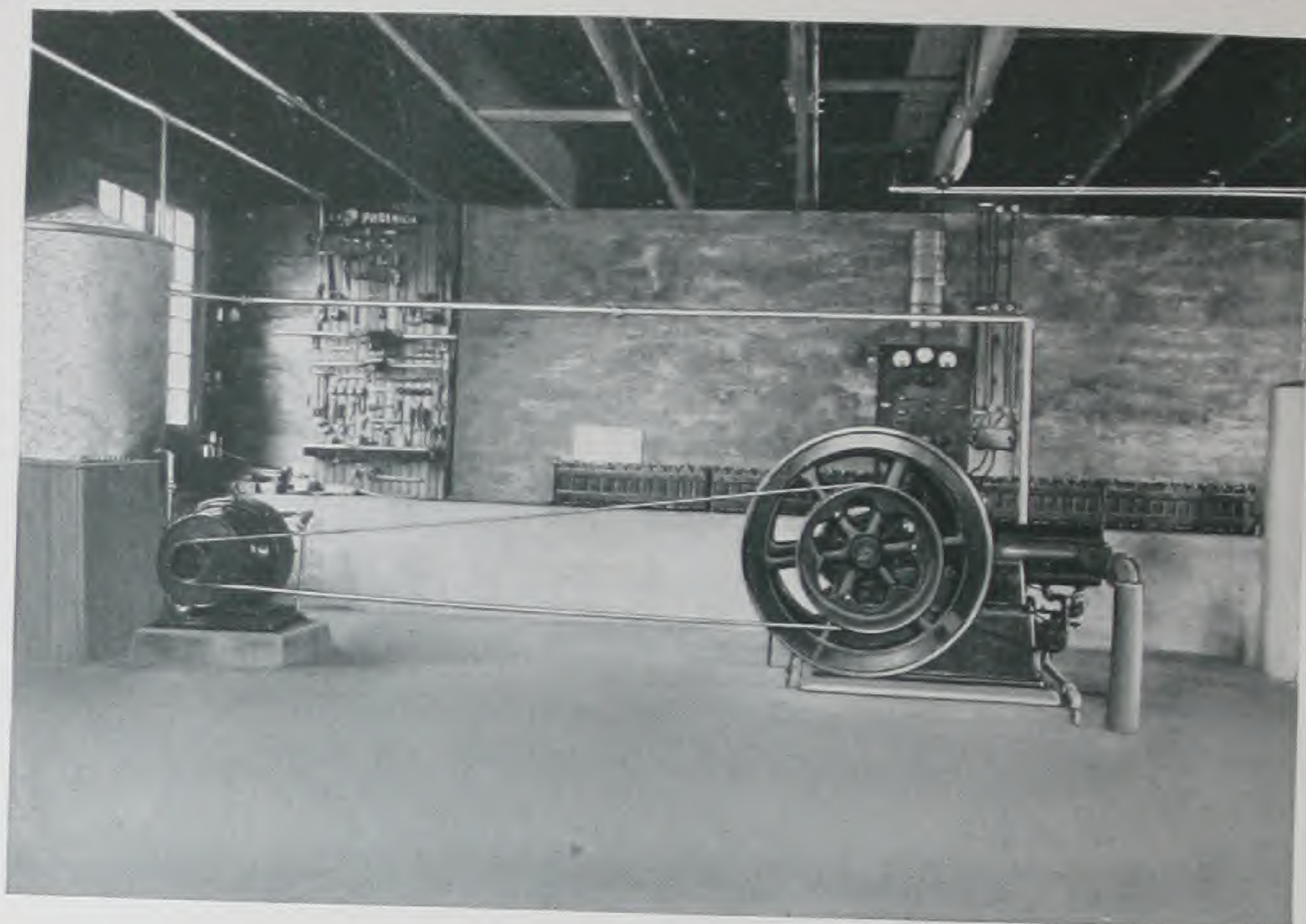
18—As the alkaline electrolyte in the Edison Cells does not freeze until the temperature reaches approximately 50 degrees below zero there is little danger from this source. Even if the Battery is exposed to freezing temperature, no serious injury can be done. There are no glass or rubber jars to break.

19—The Battery comes to you all assembled in trays, the number of trays and the number of cells per tray being determined by your



A Combination 30-volt Edison Lighting and Pumping Plant

Thomas A. Edison Electric Light Plants



The Edison Way—Clean and Sanitary

particular conditions. Twenty-four-cell 30-volt batteries are usually assembled in four trays, and ninety-four-cell 110-volt batteries in twelve trays, but any other arrangement will be furnished to your specifications without extra charge.

- 20—The Edison Battery can be left standing indefinitely in any state of discharge without the slightest deterioration—which is absolutely impossible with any other storage battery—and will be immediately ready for service when wanted. This will appeal especially to those who install systems in summer homes, as the plant can be left in operative conditions when the house is closed for the winter and, after standing idle all winter, it will be available for use immediately when the house is reopened.
- 21—The long “forming charge” of 60 to 90 hours, required by many other batteries, is not necessary, as the Edison Battery is completely assembled, filled with electrolyte, formed and fully charged when it reaches you. The cells in each tray are carefully connected with nickel-plated copper connectors held in good electrical contact by hexagonal nuts. All that is necessary to put the Battery into service, is to make the connections between trays, attach your line wires and turn on your lights.

Edison Supremacy

Those who have invested in an Edison plant have proved to their entire satisfaction that they can afford electric lights and that the Edison Battery, with the above advantages, furnishes the best and



most reliable plant at a reasonable cost. This is due to the fact that the same quality, material, design and construction is used throughout the Edison House Lighting Battery that is used in Edison Batteries for electric vehicles, train lighting or other services of more strenuous requirements. We have concentrated our entire engineering, manufacturing and research facilities, under the personal direction of Mr. Edison, on the one form of Edison Storage Battery construction which will give the best results for a maximum of time and with a minimum of attention, regardless of the function it must perform.

It requires only the most elementary knowledge of electricity and mechanics to enable the country home owner to perceive, from the foregoing, that the Edison Electric Light Plant offers the best and most reliable system of independent illumination for homes.

It is of great importance to understand that the Edison Storage Battery has none of the dangerous, disagreeable, and uneconomic characteristics that are to be reckoned with if other types of storage batteries are considered. That it gives off no corroding fumes is of prime importance. That it is not subject to sulphation, or other so-called battery "diseases", is of great significance. The term "disease", as applied to storage batteries, has no connection with Edison Storage Batteries. They do not get sick. They do not have to have their plates renewed frequently—they do not eat themselves up.



Thomas A. Edison Electric Light Plants are as Popular for Lighting Summer Homes
as for Lighting Farm Homes

The Main Advantages of the Edison Storage Battery

From an Address by Dr. Charles P. Steinmetz

Chief Consulting Engineer, General Electric Co.

"The characteristic feature of the Edison Battery, which appears to me as the main advantage, is the complete reversibility of the chemical reactions which occur in it. With the materials—iron, nickel, and their oxides, in caustic potash as electrolyte—no chemical processes can occur which are not electrolytically reversible. From that, then, would follow that there could theoretically be no deterioration of the battery; that is, no decrease of capacity from use or abuse.

"It cannot be seen how an irreversible process could occur in the



Ravenswood Farm, Bunceton, Missouri, where an A4 110-volt Edison

Battery. All these remarkable features—that you can over-charge it or over-discharge it, can stop it and let it stand charged or discharged, or partly discharged, charge it with reversed polarity, the feature that the ampere-hour efficiency is 100 per cent. less the electrolytic dissociation of water—while astonishing to one who is familiar with the lead battery, follow as a matter of course from the complete reversibility of the chemical reaction of the Edison Battery, as obvious results. Inversely, then, the existence of these properties is an additional proof that the chemical reaction is completely reversible; that is, that the battery does not age, has no definite life, but its life is limited, theoretically, only by mechanical destruction".

Electricity on the Farm

The attraction, cheerfulness and comfort of the farm home is greatly increased for all members of the family by the addition of electric lights.

From the viewpoint of the housewife, home life on the farm has been more or less drudgery—cleaning smoky lamp chimneys, refilling with smelly oil, trimming wicks, etc., almost daily, besides other work. If gas lighting plants are used somebody must keep the equipment supplied with new gas forming material and remove the used material.

In the winter, oil lamps mean poor light to sew and read by on the long nights; in the summer, a hot lamp and no comfort. Added to this there is the ever present danger of loss of life and property by fire



Plant Furnishes Light and Power to the Home, Barns and Out-Buildings

from the constant use of matches and lamps that are easily overturned.

Electricity avoids all of this. Bright, steady light always ready by a twitch of the switch. No dirt, trouble, or danger. The same light in all seasons—cool in summer and comfortable in winter.

The same electricity that supplies your light can be used to operate many labor-saving devices, such as washing machines, irons, sewing machines, vacuum cleaners, churns, etc., and turns work into play. Fans cool the house on hot days and are a wonderful relief to the sick.

For the farmer himself, electricity on the farm means *Safety First*. The barns and outbuildings as well as the home are protected. No lamps for the stock to kick over; no flame to “catch” the hay, and no

Thomas A. Edison Electric Light Plants



Far from Central Station Lines, Enjoying Every Comfort of City Life Made Possible
by Genuine Edison Electric Light

matches necessary. Electric lights enable one to do the chores after dark in perfect safety. Statistics show an amazing loss by fire annually, due to poor lighting facilities, and people on farms should be exceedingly careful because of the poor fire-fighting accommodations.

Engines are largely used throughout the day for such work as pumping, feed cutting, etc., and the storage battery can be charged at practically no cost by means of the engine, while this work is being done. The Edison storage battery is the only one allowing charging to be done at any time regardless of the state of charge.

When the day's work is done, electricity lends that comfort to the home which no other commodity can give. Those who enjoy reading in the evening will appreciate the steady light of perfect quality afforded by the Edison system.

In general, electricity on the farm is as much a necessity as good water, stock, etc. It adds to the comfort of living, decreases tiresome and unnecessary labor, and promotes social activities. It keeps the family together. No farm is complete without it.

What Voltage to Use

Voltage may be described as electrical pressure, and likened to water pressure. It takes so many pounds pressure to force an amount of water over a specified distance through a certain size pipe. Likewise, it requires so many volts of electrical pressure to force electric current through the wires, the longer distance requiring the greater voltage for the most economic operation.

Wires of larger diameters offer less resistance to electric current than those of smaller diameters. Consequently a lower voltage plant will require a larger wire than a higher voltage plant, to send the same current a like distance in both cases for the same effect.

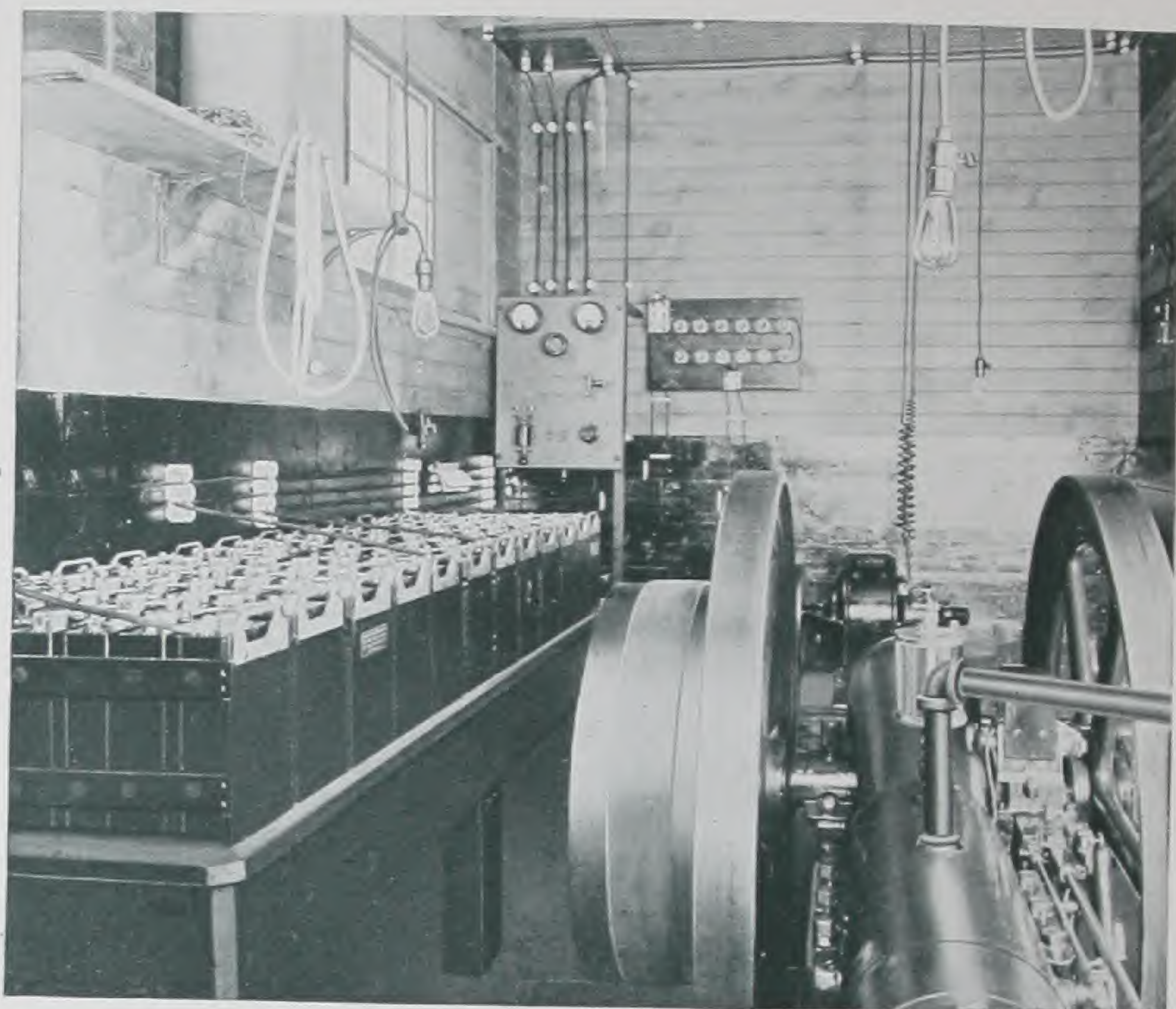
From the foregoing it will be seen that a low voltage plant will be adequate for sending current a certain distance, but a point will finally be reached where the difference in cost between large diameter copper wire suitable for this voltage and that suitable for a higher voltage plant will more than offset the difference in cost between the plants.

The Edison Electric Light Plants are regularly furnished in 30 and 110 volts, but any special voltage can be furnished to meet specific



Made Comfortable and Safe by an Edison Electric Light Plant

Thomas A. Edison Electric Light Plants



A Compact 110-volt Edison Plant

requirements. The 30-volt sizes are generally used in the average 8 to 10-room farm home or bungalow where current is not to be transmitted over distances greater than about 300 feet. The 110-volt sizes are to be recommended in large summer homes and where current is to be transmitted over a distance greater than 300 feet.

In addition to the above it may be added that washing machines, electric irons, vacuum cleaners, etc., may be operated from the 30-volt systems, but where larger or more appliances are to be used at one time we recommend the 110-volt system.

It is impossible to specify any particular voltage or capacity plant without knowing exact conditions, and we prefer to treat each case individually. We have an Engineering Department established at our factory, which is at your service for advice on all matters pertaining to the proper installation of an electric light plant.

If you are undecided as to what size and voltage of plant to use, we will be glad to assist you, and make complete recommendations on the plant itself, if you will send us the answers to the questions on page 23.

Edison Installations

On the opposite page, we show a photograph of an actual complete installation of the Edison type B4-110 plant. Note the compact arrangement of all equipment necessary for a complete plant and the close proximity of the storage battery to the machinery. No special battery room is required for the Edison Storage Battery as no corrosive or offensive odors are prevalent. This is an exclusive Edison feature.



Durable and Simple

Simplicity is the keynote of the Edison Electric Lighting System. Engines and dynamos of any standard manufacture are practically trouble-free. The Edison equipment includes measuring instruments of the best make, which can be depended upon to show the actual charging and discharging conditions. Edison Electric Light Plants are shipped complete, with or without engine or dynamo, or both. If you have an engine, we will supply the battery, switchboard and dynamo complete, ready to connect to your engine and operate. The switchboard has been so constructed that the operations are of the simplest nature and anyone can operate it. See the description of the Edison Standard Switchboard given on page 18. There is no chance or danger of a mistake, because it is impossible to make one.



Thomas A. Edison Electric Light Plants

Edison Standard Switchboard

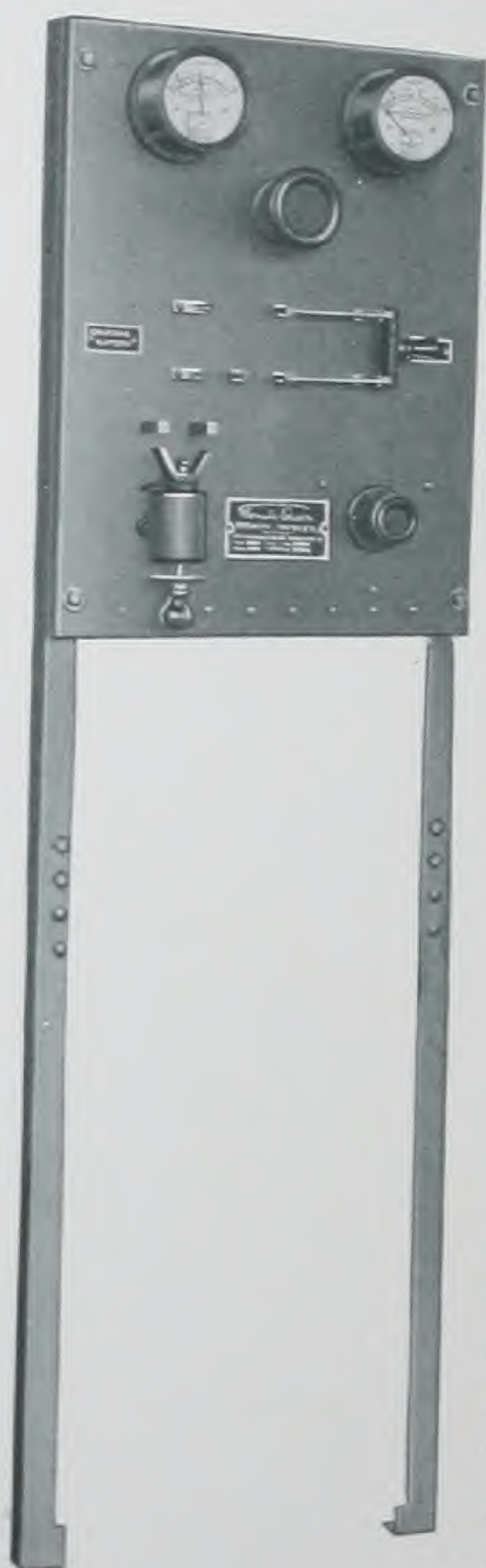
The simplicity of operating an Edison Electric Lighting Plant is well illustrated by the view of a standard switchboard shown herewith. The switchboard is manufactured by us, and switches, rheostats, meters, etc., are all of standard make. The panel itself is of high grade Monson slate and, like the apparatus on it, is built for rugged service. We furnish the legs and wall braces.

We have worked out with great care the general arrangement of our Standard switchboards. Ammeter and voltmeter show actual charging and discharging conditions. The charging rheostat shown

by the large hand wheel regulates the charging rate of the battery. The underload cut-out mounted on the lower left hand corner of the board prevents the storage battery from discharging back through the dynamo if the engine should suddenly stop or the dynamo voltage become too low. These boards permit the following:

- 1—Lights from dynamo only.
- 2—Lights from dynamo while battery is being charged.
- 3—Lights from battery only.

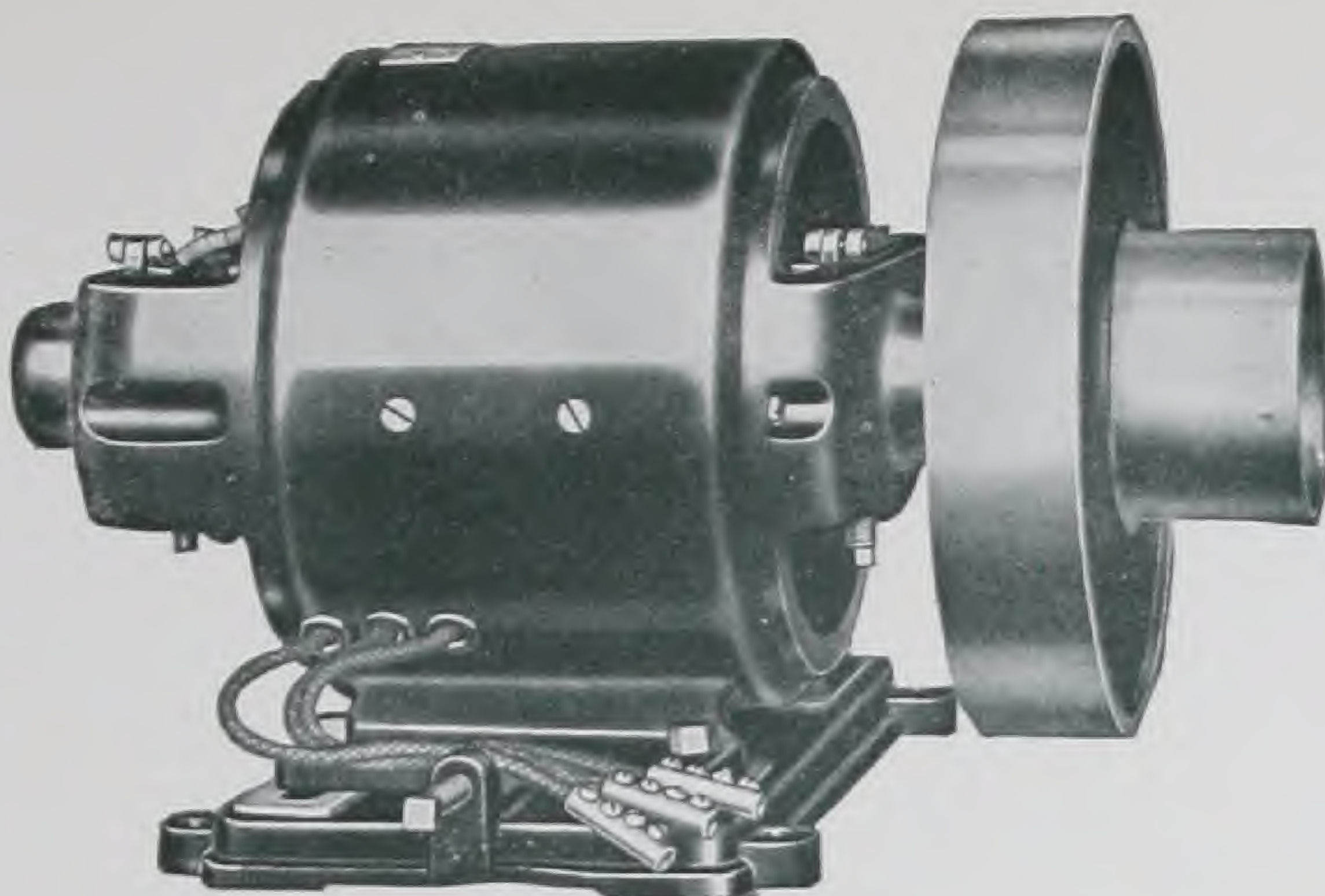
The illustration shows the generator field rheostat mounted on the switchboard. If we furnish the generator this rheostat is supplied free of charge, mounted on the board; otherwise, a small additional charge will be made.



Engines and Dynamos

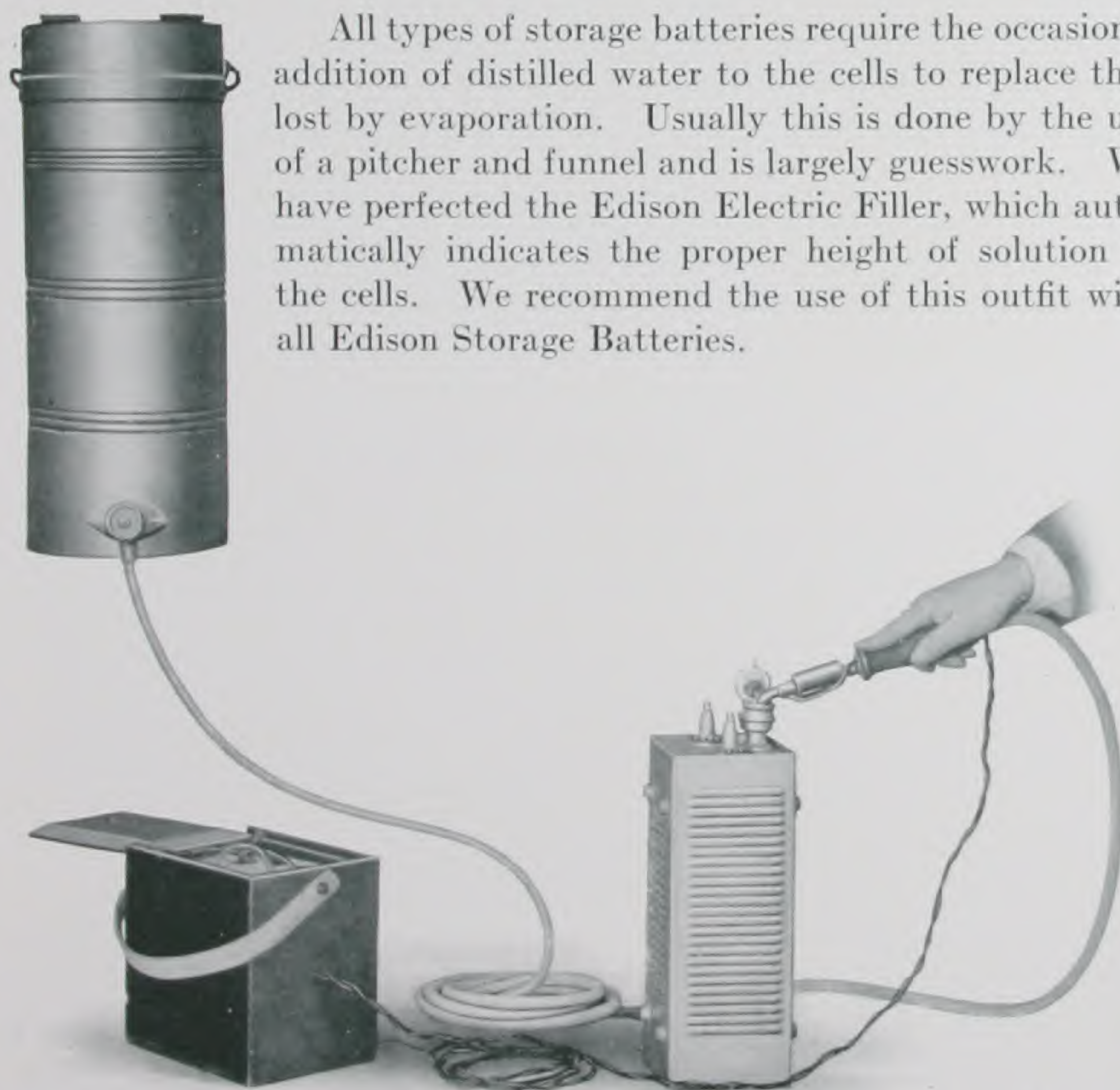
The Edison Storage Battery Company does not manufacture engines and dynamos, but will supply them, if you so desire. You can use the engine you have, provided it has sufficient power and good speed regulation. The dynamos we supply are special machines equipped with belt-tightening bases, field rheostats and fly-wheel pulleys, which make

them far superior for this service, as they run much more steadily than the ordinary dynamos. Due to the large quantity of dynamos we use, we are able to make a very low price for the high grade machines we supply.



The Edison Electric Filler

All types of storage batteries require the occasional addition of distilled water to the cells to replace that lost by evaporation. Usually this is done by the use of a pitcher and funnel and is largely guesswork. We have perfected the Edison Electric Filler, which automatically indicates the proper height of solution in the cells. We recommend the use of this outfit with all Edison Storage Batteries.



Thomas A. Edison Electric Light Plants

Direct Connected Sets

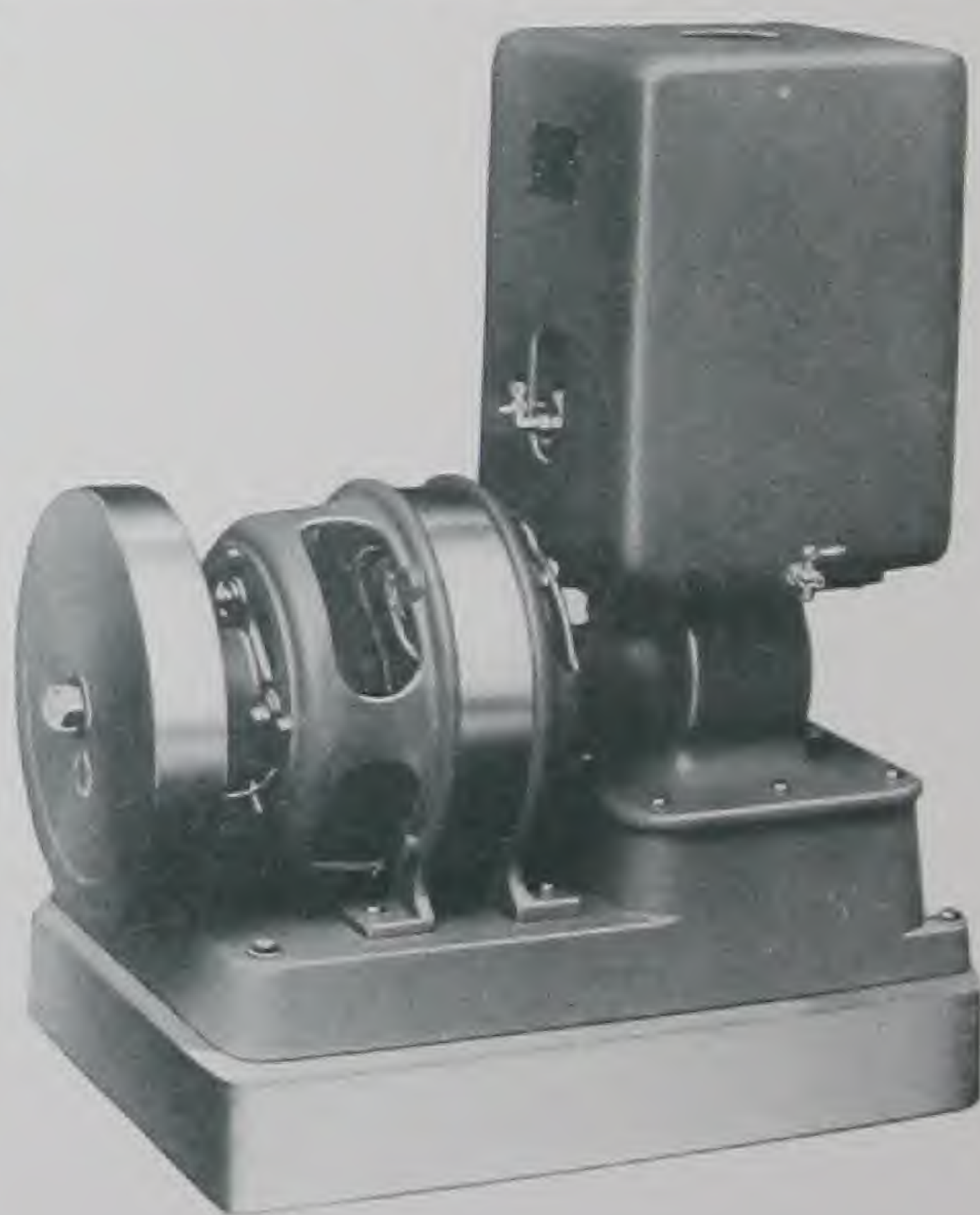
There is an ever increasing demand for a small, compact, reliable, direct connected set consisting of engine and dynamo mounted on one base as shown. These sets are particularly desirable where one has no gas engine of any kind and merely desires the plant for straight electric lighting purposes only, or desires to use a few electric utilities.

Referring to the illustration shown, the engine, dynamo and all controlling devices have been combined into one compact unit, occupying a smaller space than a sewing machine. The size is only 30½ inches by 24 inches by 19 inches. The water hopper has 9 gallons capacity, fuel tank in base holds 4½ gallons.

Sets of this kind are usually high speed, the engine operating at 900 to 1,000 R.P.M. In order to secure the best of service these must be constructed throughout of exceptionally good material, carefully machined and assembled by skilled workmen. We recommend only equipments made in this way and made to give the same long satisfactory service as is obtained by using the Edison Storage Battery.

The standard battery equipment for a plant of this kind consists of 24 cells of our type B4H as shown on page 7 of this catalog. The battery may be arranged in any convenient position near the engine or dynamo without any specially constructed racks, etc., and makes a very conveniently handled and compact equipment. Because of the fact that the Edison Storage Battery gives off no harmful or obnoxious gases it does not matter how closely it is located to the engine or dynamo set; no corrosion will result.

The Edison Storage Battery Company has no financial interests in the manufacture of any of these plants. We recommend only the best equipment obtainable and that which we know will give the longest life at a minimum upkeep expense. We are, therefore, in a position to refer you to manufacturers who are in a position to supply equipments of this kind if you need one.



Data on 30-Volt Edison Lighting Plants

Type of Plant		Volts		LAMP CAPACITY						EQUIPMENT					
				Candle Power	Watts	On One Charge of Battery		Number from Dynamo	Battery		Filling Outfit	Switchboard Edison Standard Type	Dynamo		Engine Horse Power
						No.	Hours		No. Cells	Type			Volts	Amps.	
B2-30	30	16	20	12	5	24	24	B2H	Edison Electric	B2-30	30	16	1½-2		
				10	6										
				8	7										
				7	8										
B4-30	30	16	20	24	5	48	24	B4H	Edison Electric	B4-30	30	30	2-2½		
				20	6										
				18	7										
				16	8										
B6-30	30	16	20	36	5	72	24	B6H	Edison Electric	B6-30	30	45	2½-3		
				30	6										
				26	7										
				22	8										
A4-30	30	16	20	45	5	90	24	A4H	Edison Electric	A4-30	30	60	3-4		
				37	6										
				32	7										
				28	8										

NOTE—Other voltages and capacities will be furnished on request. See page 24 for 110-volt plants.

Data on 110-Volt Edison Lighting Plants

Type of Plant		Volts		LAMP CAPACITY				EQUIPMENT							
				Candle Power	Watts	On One Charge of Battery		Number from Dynamo	Battery		Filling Outfit	Switchboard Edison Standard Type	Dynamo		Engine Horse Power
						No.	Hours		No. Cells	Type			Volts	Amps.	
B1-110	110	16	20	20	5	55	94	B1H	Edison Electric	B1-110	110	10	2-2½		
				17	6										
				15	7										
				13	8										
B2-110	110	16	20	45	5	110	94	B2H	Edison Electric	B2-110	110	20	4-4½		
				36	6										
				31	7										
				27	8										
B4-110	110	16	20	88	5	176	94	B4H	Edison Electric	B4-110	110	30	6-7		
				73	6										
				63	7										
				55	8										
B6-110	110	16	20	132	5	260	94	B6H	Edison Electric	B6-110	110	45	10-11		
				110	6										
				95	7										
				82	8										
A4-110	110	16	20	165	5	340	94	A4H	Edison Electric	A4-110	110	60	12-15		
				138	6										
				118	7										
				103	8										

NOTE—Other voltages and capacities will be furnished on request. See page 21 for 30-volt plants.

110 or 30 Volts

If you are undecided as to what size and voltage plant to use, we will be glad to assist you, if you will answer the following questions:



1. How many rooms do you wish to illuminate in your residence?

2. Are your premises wired?

3. How many lights will you burn each evening and how long?

4. Do you wish to illuminate any out-buildings? If so, specify how many lights you desire in each

5. Do you want to use electric irons?

6. Do you want to use fans or small motors?

7. What size and make of engine have you?

8. Give speed R.P.M., fly-wheel diameter

....., and pulley diameter

9. What work does it perform now?

10. Has it operated satisfactorily?

11. How many hours per day is it in operation?

12. Have you a dynamo and engine already in operation, and simply need a storage battery?

13. If so, please copy the data on the name plate on the dynamo

14. When is the dynamo in operation during the day?

15. Have you a switchboard? If so, send wiring diagram and list of material on the board, on a separate sheet.

16. Refer to the back of this page and give distances to various buildings where lights will be used.

Name

Address

County

Date

State

Assume that the circle shown in the space below is the building in which you wish to locate your plant. Draw lines showing the distances to the various buildings that are to be supplied with electric light and give approximate distances to the different buildings from the plant. Give number of lamps to be used in each building. In what building would you prefer to locate the plant?



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CCA